Dave G.

Matt Blunt, Governor • Doyle Childers, Director

DEPARTMENT OF NATURAL RESOURCES

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October 10, 2008

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Mr. Tom Meitner Environmental Division Modine Manufacturing Company 1500 DeKoven Avenue Racine, WI 53403-2552

RE:

Corrective Action Environmental Indicator (EI) Evaluation CA750 Migration of Contaminated Groundwater Under Control Modine Manufacturing Company, Camdenton, Missouri EPA ID# MOD062439351

Dear Mr. Meitner:

The Missouri Department of Natural Resources' Hazardous Waste Program (HWP) has completed the Migration of Contaminated Groundwater Under Control Corrective Action EI evaluation of the Modine Manufacturing Company, Camdenton, Missouri, facility. An EI evaluation for Current Human Exposures Under Control (CA75) was completed by the HWP July 12, 2004. As you are aware, the U.S. Environmental Protection Agency (EPA) and Congress have recently been interested in developing the means to gauge the progress, on a national level, of human health and environmental protection at corrective action facilities. The enclosed EI evaluation is an outgrowth of that interest. This evaluation represents a "snapshot" of current facility conditions in terms of migration of contaminated groundwater (CA750).

The EI evaluation format was developed jointly by an EPA-State work group to address specific corrective action goals established pursuant to the federal Government Performance Results Act of 1993. These corrective action goals are to control human exposures to contamination at 95 percent, and migration of contaminated groundwater at 80 percent, of high priority Government Performance Results Act "baseline" facilities by the end of federal fiscal year 2008.

Enclosed is a copy of the CA750 El evaluation for the Modine Manufacturing Company facility. The HWP is pleased to advise you that it has been determined that migration of contaminated groundwater is currently considered under control within the context of the EI evaluation.

Recycled Paper

RCRA

Mr. Tom Meitner October 10, 2008 Page 2

Thank you for your continued commitment to environmental protection. If you have any questions about the enclosed EI evaluations, please feel free to contact me at the Missouri Department of Natural Resources, 7545 South Lindbergh, St. Louis, MO 63125-4039, or by phone at (314) 416-2960 Ext. 256, or Mr. Daniel Gravatt of the EPA at (913) 551-7324.

Sincerely,

HAZARDOUS WASTE PROGRAM

Christine Kump-Mitchell, P.E.

Environmental Engineer

Permits Section

CKM:mj

Enclosure

c: Ms. Monica Martin, CH2MHILL

Mr. Daniel Gravatt, U.S. EPA, Region VII

Mr. David Garrett, U.S. EPA, Region VII

Southwest Regional Office

Documentation of Environmental Indicator Determination in accordance with EPA Interim Final Guidance 2/5/99

RCRA Corrective Action Environmental Indicator (EI) RCRA Info Code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name:

Modine Manufacturing Company

Facility Address:

221 Sunset Drive, Camdenton, Missouri

Facility EPA ID #:

MOD062439351

1.	1. Has all available relevant/significant information on known and reasonably suspected		
	the groundwater media, subject to RCRA Corrective Action (e.g., from Solid		
Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (been considered in this EI determination?			
	<u>X</u>	If yes - check here and continue with #2 below.	
		If no - re-evaluate existing data, or	
		If data are not available, skip to #8 and enter "IN" (more information needed)	
		status code.	

Modine Manufacturing Company (Modine) entered into a Corrective Action Abatement Order on Consent (Order) with the Department of Natural Resources' (DNR) Hazardous Waste Program in July 1999. A complete review of previous investigations was conducted at that time to identify all areas of potential concern at the facility. A summary of these areas and the corrective action activities up to the date of the Order are included in the Order. Activities conducted after the Order are summarized in the Summary Report of Investigative and Remedial Activities Conducted to Achieve Closure of the Interim TSD Facility (Dames & Moore, 1998), and in the Comprehensive Historical Summary Document (CH2MHill, 2005). Additional soil investigation activities were conducted under the manufacturing building in October 2006 and December 2007.

The Modine facility is located on approximately 67 acres in Camdenton, Missouri. Operations at the facility included the manufacturing of aluminum and copper coils and feeder parts used in the manufacture of heat transfer products. Operations began at the site in 1967 under ownership of Dawson Metal Products. Sundstrand Tubular Products took over operations from 1974 to 1990. Modine is the current owner and has operated the facility since 1990.

Historically, 36 solid waste management units and four area of concerns have been identified at Modine. Wastes generated by Modine's processes included chromium precipitate, used lubricating and hydraulic oil, solvent-based paint wastes, treatment sludge, and spent chlorinated solvents.

The Hulett Lagoon, a former city of Camdenton municipal wastewater lagoon, is located approximately 1000 feet northeast of Modine. Prior to installation of an on-site wastewater treatment plant at the facility, untreated wastewater was discharged to the Hulett Lagoon. The bulk of the contaminated groundwater is believed to be related to the operation of the former lagoon. Due to the proximity of Modine and the Hulett Lagoon, any groundwater contamination from the Modine property would be comingled with contamination from the lagoon. The Hulett Lagoon is not subject to the jurisdiction of Corrective Action Abatement Order between Modine and the DNR. However, the long-term disposition of groundwater in the area is being addressed by Hamilton-Sundstrand, through a Letter of Agreement with the DNR Superfund program. Hamilton-Sundstrand are prior owners/operators of the Modine property.

References

Dames & Moore. 1998. "Summary Report of Investigative and Remedial Activities conducted to Achieve Closure of the Interim TSD Facility."

Missouri Department of Natural Resources. 1999. "Corrective Action Abatement Order on Consent for Modine Manufacturing Company, Camdenton, Missouri."

CH2MHill. 2005. "Comprehensive Historical Summary Document."

CH2MHill, 2006. "Final Site Investigation Work Plan, Modine Manufacturing Company, Camdenton Missouri." September.

CH2MHill, 2007. "Investigation Work Plan, Modine Manufacturing Company, Camdenton Missouri." October.

BACKGROUND

<u>Definition of Environmental Indicators (for Resource Conservation and Recovery Act (RCRA) Corrective Action)</u>

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EIs developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the

original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA Corrective Action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While final remedies remain the long-term objective of the RCRA Corrective Action program the EIs are near-term objectives which are currently being used as program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater and contaminants within groundwater (e.g., non-aqueous phase liquids). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration/Applicability of EI Determinations

EI Determination status codes should remain in RCRA Info national database ONLY as long as they remain true (i.e., RCRA Info status codes must be changed when the regulatory authorities become aware of contrary information).

2.	Is groundwater known or reasonably suspected to be " contaminated " above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act]) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?		
	<u> X</u>	If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.	
		If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."	
		If unknown – skip to #8 and enter "IN" status code.	

¹ "Contamination" and "contaminated" describes media containing contaminants (in any form, non-aqueous phase liquid and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

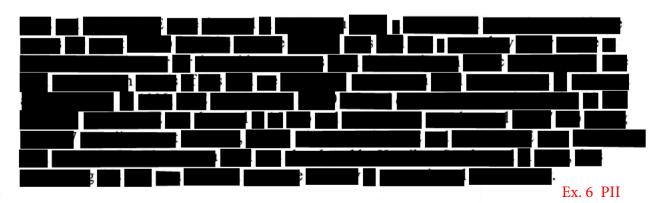
Rationale:

Groundwater at and around the Modine facility is contaminated with trichloroethene (TCE) at concentrations above the maximum contaminant level (MCL) of 5 parts per billion (ppb). TCE has been detected at concentrations above the MCL in groundwater monitoring wells located at and in the off-site vicinity of the facility, at the Mulberry Well (city of Camdenton municipal



Metals were detected in soil and groundwater samples collected from the former lagoon and surrounding area. It was determined that metals concentrations above detection limits are representative of background and reflect the natural occurrence of metals in soil in central Missouri (SECOR, 2003). No other constituents are present at concentrations above state or federal standards.

The Mulberry Well is located approximately 600 feet east-southeast of Modine and 1000 feet south of the former Hulett Lagoon. The Mulberry Well was drilled in 1986 to a depth of about 900 feet below ground surface and cased to a depth of about 400 feet bgs (SECOR, 2002). TCE was first detected above the MCL of 5 ppb in the Mulberry Well in 1998. Subsequent to the recognition/confirmation of the TCE contamination, the Mulberry Well was taken off line by the city but continues to be pumped to waste for the purpose of controlling the groundwater contaminant plume. The city of Camdenton continues to sample the Mulberry Well monthly for TCE. Concentrations of TCE detected in the Mulberry Well since January 2007 range from 8.5 ppb to 46.6 ppb with an average concentration of 17.2 ppb. The city of Camdenton has a permit from the Missouri Department of Natural Resources' Water Protection Program allowing the city to pump the well and release the water to the ground. The water from the well flows through a series of corrugated troughs that channel the water down the hill before it is released to the ground surface. This agitates the water causing concentrations of TCE to quickly decrease to non-detect levels. The permitted discharge limit for TCE at the Mulberry Well is 75 ppb. No other constituents have been detected in the Mulberry Well, nor has TCE been detected in any other city municipal wells.



TCE, cis-1,2-DCE, and vinyl chloride were detected above site-specific screening levels in surface and subsurface soil on the west side of the Modine plant. Approximately 4614 tons of volatile organic compounds impacted surface and subsurface soil with concentrations above the site-specific action levels were excavated and removed to the top of the bedrock, the excavation was subsequently backfilled with clean soil and restored (CH2MHill, 2002). Therefore, surface and subsurface soil west of the manufacturing building are no longer potential sources to groundwater contamination.

In 2006 and 2007, Modine conducted soil sampling underneath the manufacturing building to determine if contaminated soil under the manufacturing building is acting as a continuing source to groundwater contamination. Results of the soil sampling activities indicate that contaminant concentrations under the building are not a significant contributing source to groundwater (CH2MHill, 2008).

References:

CH2MHill, 2002. "Technical Memorandum, RCRA Corrective Action Summary, Modine Manufacturing Company, Camdenton Missouri." July.

CH2MHill, 2006. "Final Site Investigation Work Plan, Modine Manufacturing Company, Camdenton Missouri." September.

CH2MHill, 2007. "Investigation Work Plan, Modine Manufacturing Company, Camdenton Missouri." October.

CH2MHill. 2008. The draft "RCRA Facility Investigation Report, Modine Manufacturing Company, Camdenton, Missouri." April.

Continental Analytical Services, Inc., Analytical Laboratory Data Sheets, January 2007 to July 2008.

Dan Price. 2008. e-mail Results of December 16 Subsurface Investigation. January.

Dames & Moore. 1999. "RCRA Facility Investigation, Modine Manufacturing Company, Camdenton, Missouri." October.

U.S. Environmental Protection Agency, 2002a. "List of Contaminants and their MCLs." EPA 816-F-02-013. July.

Missouri Department of Natural Resources. 1998. "Private Well Sampling Activities." May.

Missouri Department of Natural Resources. 2006. Analytical Results from June 20, 2006, Sewer Line Sampling and October 25-26, 2006, Soil Sampling Under the Manufacturing Buliding, Modine Manufacturin Company, Camdenton, Missouri. December.

SECOR International Inc. 2002. "Work Plan Phase III Remedial Investigation/Feasibility Study "Deep" Aquifer, Former Hulett Lagoon, Camdenton, Missouri." April.

SECOR International Inc. 2003. "Remedial Investigation Summary Report, Volumes 1 and 2, Former Hulett Lagoon, Camdenton, Missouri." November.

SECOR International Inc. 2004. "Feasibility Study, Former Hulett Lagoon, Camdenton, Missouri." October.

SECOR International Inc. 2008. "DRAFT Annual Report of Quarterly Groundwater Sampling Former Hulett Lagoon." January.

Severn Trent Laboratories Analytical Reports Monthly Mulberry Well Sampling Results. January 2004 through December 2007.

3.	Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater" as defined by the monitoring locations designated at the time of this determination)?		
	<u>X</u>	If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination" ²).	
		If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination" ²) skip to #8 and enter "NO" status code, after providing an explanation.	
		If unknown - skip to #8 and enter "IN" status code.	

Rationale:

Hamilton Sundstrand, through a cooperative agreement with the DNR's Hazardous Waste Program's Superfund Section, conducted an investigation of the migration and extent of groundwater contamination from the nearby former Hulett Lagoon. Due to the proximity of the facility and Hulett Lagoon, there is a high probability of commingling TCE plumes. However, the bulk of the groundwater contamination is believed to be related to the operation of the former Hulett Lagoon.

Remedial investigation activities, conducted by Hamilton Sundstrand, identified the presence of two groundwater zones, a thin "perched zone" and an underlying "deep" aquifer (SECOR, 2003). Results of Hamilton Sundstrand's investigation activities suggest that the majority of contaminant mass has accumulated within the perched zone. This is primarily due to the presence of a low permeability zone that inhibits vertical migration and forms the base of the perched zone system. This low permeability zone appears to be laterally continuous across the former lagoon and surrounding area and likely influences horizontal groundwater and contaminant migration within the perched zone system. Groundwater contamination detected within the deep aquifer appears to be a result of vertical migration through the overlying low permeability zone (SECOR, 2003).

² "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

Vertical contaminant migration may have been influenced by the presence of two monitoring wells (MW-3 and MW-4) that were completed as open boreholes through both perched zones and deep aquifer (SECOR, 2003). These wells were abandoned in 2002 eliminating the potential for these wells to be a pathway for contaminant migration.

An extensive groundwater monitoring well network has been installed to determine the extent of groundwater contamination in the vicinity of Modine, the former Hulett Lagoon, and the Mulberry Well. Currently, nine perched zone wells and twelve deep zone wells comprise the groundwater monitoring well network. The number and location of monitoring wells are currently sufficient to demonstrate that the TCE and cis-1,2-DCE plumes are defined.

The TCE and cis-1,2-DCE plumes in the perched zone are bounded on the south, west, and east by monitoring wells with no detections or detections below the MCL. The TCE and cis-1,2-DCE plumes in the deep zone are bounded by non-detect monitoring wells in all directions (SECOR, 2008). In general, TCE and cis-1,2-DCE concentrations in the deep zone wells are an order of magnitude lower than their perched zone counterparts. This indicates that migration to TCE and cis-1,2-DCE through the low permeability zone is limited.

References:

SECOR International Inc. 2002. "Work Plan Phase III Remedial Investigation/Feasibility Study "Deep" Aquifer, Former Hulett Lagoon, Camdenton, Missouri." April.

SECOR International Inc. 2003. "Remedial Investigation Summary Report, Volumes 1 and 2, Former Hulett Lagoon, Camdenton, Missouri." November.

SECOR International Inc. 2004. "Feasibility Study, Former Hulett Lagoon, Camdenton, Missouri." October.

SECOR International Inc. 2008. "DRAFT Annual Report of Quarterly Groundwater Sampling Former Hulett Lagoon." January.

4.	Does "contaminated" groundwater discharge into surface water bodies?		
	-	If yes - continue after identifying potentially affected surface water bodies.	
	<u>X</u>	If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.	
		If unknown - skip to #8 and enter "IN" status code.	

Rationale:

Modine has a General Storm Water Permit issued by the DNR's Water Protection Program (Permit Number MO-R203055). The facility storm sewer directs surface runoff to the southern end of the site. Runoff not collected in the storm sewer flows southwest-west to a series of manhole collection points directing runoff through a lift station to the Camdenton Publicly Owned Treatment Works (Jacobs, 1992). No permanent surface water bodies exist on the Modine property. Sampling of stormwater runoff and a stream and spring downgradient of the site showed no constituents (VOCs) detected in surface water (Law, 1994). The nearest surface water body is the Niangua Arm of the Lake of he Ozarks, located approximately 1.5 miles west of the facility (SECOR, 2003).

References:

Jacobs Engineering Group, Inc. 1992. "Alternative Remedial Contacts Strategy." September.

Law Engineering and Environmental, 1994. "Environmental Risk Assessment of Former Drum Storage Areas." August.

surface water is less than 10 times the appropriate groundwater "level," at other conditions (e.g., the nature or number of discharging contaminants,		ficant " (i.e., the maximum concentration ³ of each contaminant discharging into vater is less than 10 times the appropriate groundwater "level," and there are no aditions (e.g., the nature or number of discharging contaminants, or environmental which significantly increase the potential for unacceptable impacts to surface water,
		If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration ³ of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments or eco-system.
		If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration ³ of <u>each</u> contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations ³ greater than 100 times the appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.
		If unknown - enter "IN" status code in #8.
Rat	ionale and	Reference(s):

³ As measured in groundwater	prior to entry to the grou	undwater-surface water/	sediment
interaction (e.g., hyporheic) zo	ie.		

6.	Can the discharge of "contaminated" groundwater into surface water be shown to be " currently acceptable " (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented ⁴)?		
		If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment, appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialist(s), including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bioassays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.	
		If no - (the discharge of "contaminated" groundwater cannot be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments and/or eco-systems.	
		If unknown - skip to 8 and enter "IN" status code.	
Rati	onale and	Reference(s):	

⁴Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵ The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments, or eco-systems.

7.	data, as no remained	ndwater monitoring /measurement data (and surface water/sediment/ecological ecessary) be collected in the future to verify that contaminated groundwater has within the horizontal (or vertical, as necessary) dimensions of the "existing area of ated groundwater?"
f 1.		If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."
		If no - enter "NO" status code in #8.
		If unknown - enter "IN" status code in #8.

Rationale:

All groundwater monitoring wells in the vicinity of the Modine facility and the former Hulett Lagoon are currently monitored quarterly by Hamilton Sundstrand. Quarterly monitoring is sufficient to determine any changes in the contaminant plumes over time.

References:

SECOR International Inc. 2008. "DRAFT Annual Report of Quarterly Groundwater Sampling Former Hulett Lagoon." January.

8.	Groundwater appropriate N	propriate RCRA Info status codes for the Migration of Contaminated Under Control EI (event code CA750), and obtain Supervisor (or Manager) signature and date on the EI determination below (attach upporting documentation as well as a map of the facility).
	Based on a red determined the Modine Man Sunset Drive migration of conducted to contaminated	Migration of Contaminated Groundwater Under Control" has been verified. Eview of the information contained in this EI determination, it has been that the "Migration of Contaminated Groundwater" is "Under Control" at the ufacturing Company facility, EPA ID# MOD062439351, located at 221 Camdenton, Missouri. Specifically, this determination indicates that the "contaminated" groundwater is under control, and that monitoring will be confirm that contaminated groundwater remains within the "existing area of groundwater." This determination will be re-evaluated when the agency re of significant changes at the facility.
-	NO - Unacce	eptable migration of contaminated groundwater is observed or expected.
	IN - More in	formation is needed to make a determination.
Completed by: Supervisor:		(Signature) Robert Jan CKM Date 9-30-88 (Print) Christine Kump-Mitchell, P.E. (Title) Environmental Engineer
		(Signature) Date 9-30-08 (Print) R. Bruce Stuart, P.E., R.G. (Title) Chief, Groundwater Unit (EPA Region or State) Missouri
Missour 1730 Ea Hazardo Modine Monitor	i Department st Elm Street, us Waste Pro Manufacturin	g Company – Treatment, Storage, and Disposal and Groundwater
Contact	telephone and	e-mail numbers:
(Phone #	Christine Kun (314) 416-2 Christine.kum	
ref: <i>ca75</i>	0epa.doc	